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PATENT & TRADEMARK OFFICE

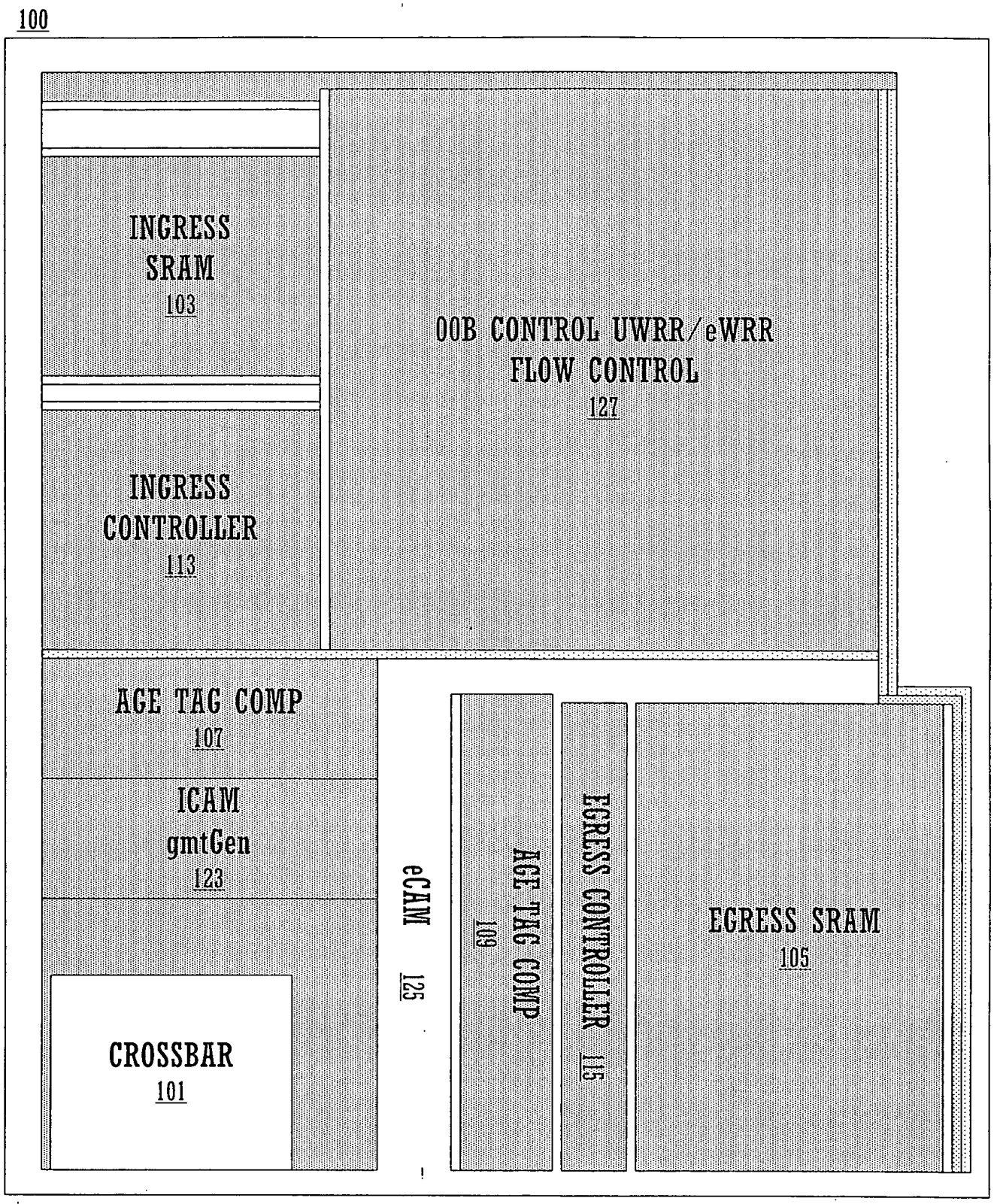

FIGURE 1

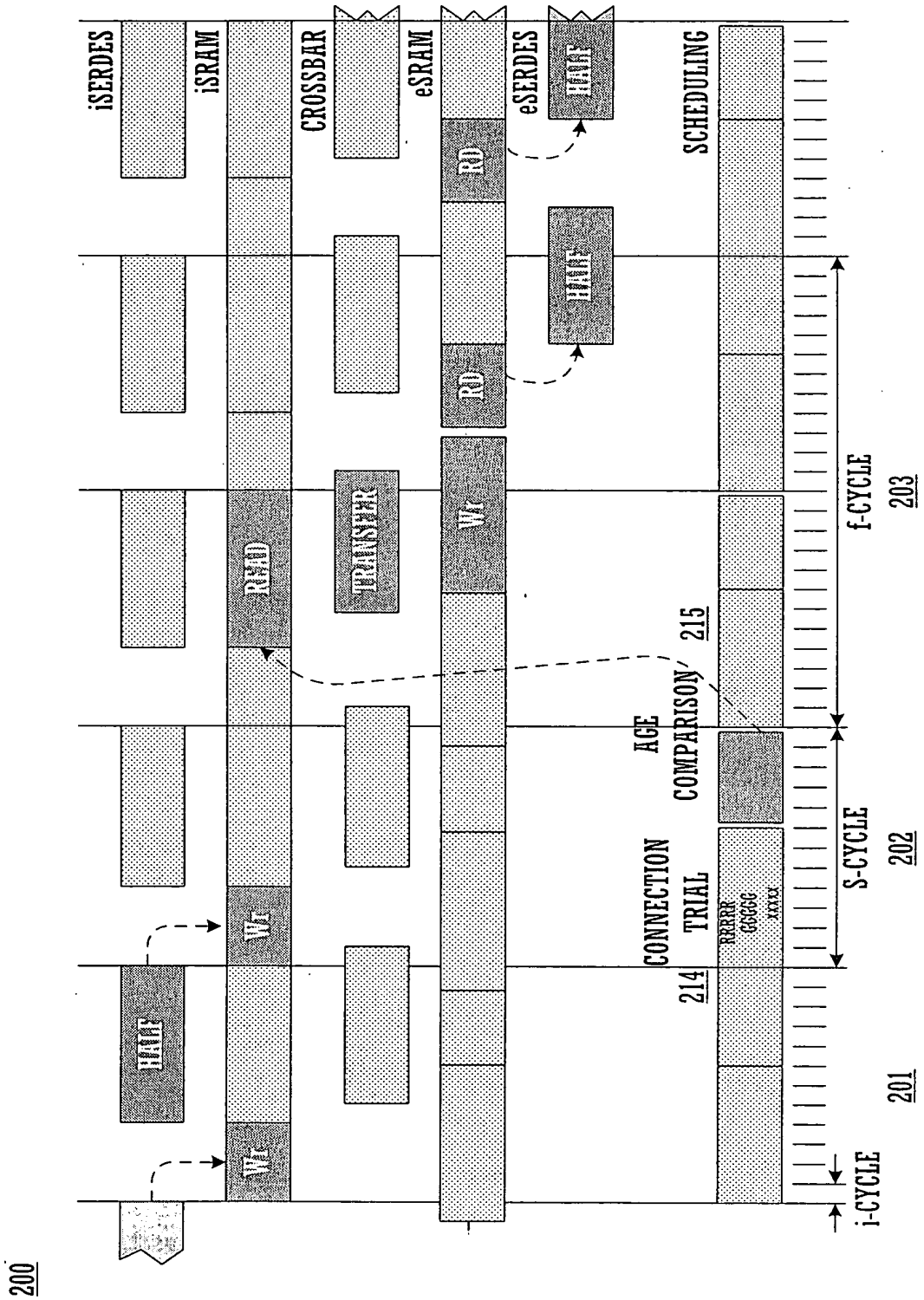
iSERDES
iSRAM
CROSSBAR
eSRAM
eSERDES
SCHEDULING
RD
TRANSFER
WR
CONNECTION TRIAL
AGE COMPARISON
215
214
f-CYCLE
203
S-CYCLE
202
i-CYCLE
201
200

FIGURE 2

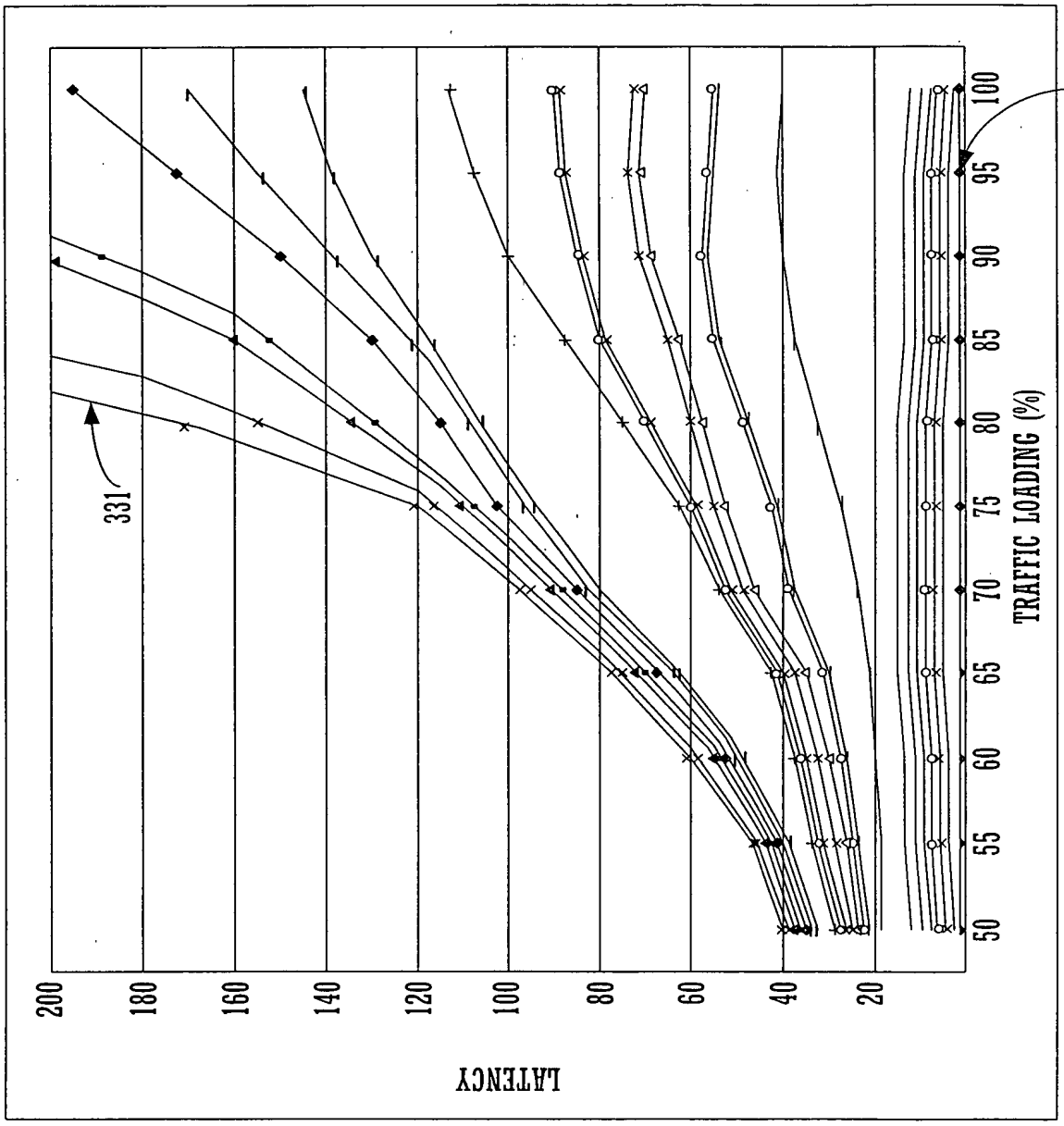
300
331
TRAFFIC LOADING (%)
50
55
60
65
70
75
80
85
90
95
100
LATENCY
200
180
160
140
120
100
80
60
40
20

FIGURE 3

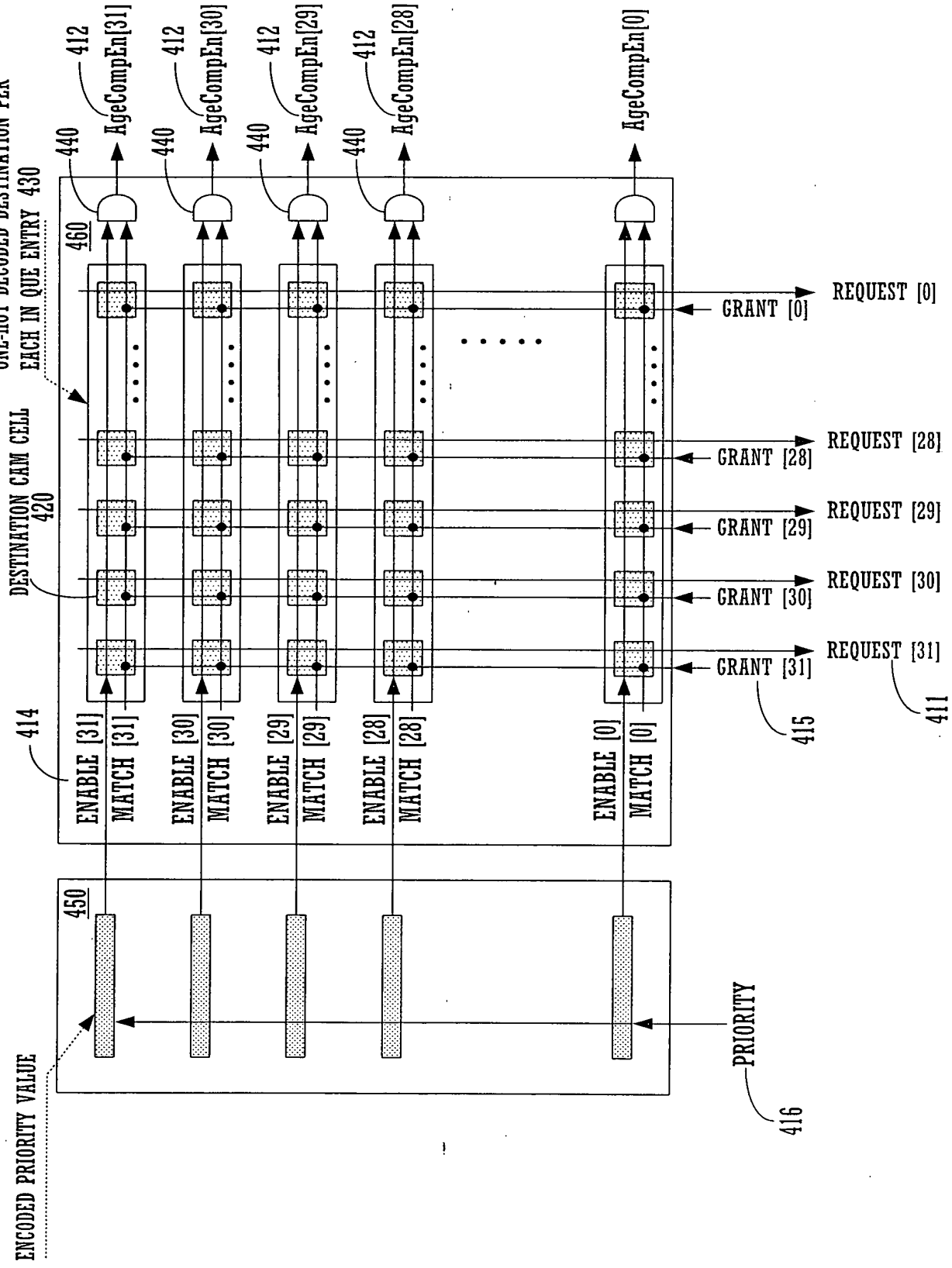
ONE-HOT DECODED DESTINATION PER EACH IN QUE ENTRY 430
DESTINATION CAM CELL 420
ENCODED PRIORITY VALUE
412
AgeCompEn[31]
AgeCompEn[30]
AgeCompEn[29]
AgeCompEn[28]
AgeCompEn[0]
440
460
450
414
ENABLE [31]
MATCH [31]
ENABLE [30]
MATCH [30]
ENABLE [29]
MATCH [29]
ENABLE [28]
MATCH [28]
ENABLE [0]
MATCH [0]
REQUEST [0]
GRANT [0]
REQUEST [28]
GRANT [28]
REQUEST [29]
GRANT [29]
REQUEST [30]
GRANT [30]
REQUEST [31]
GRANT [31]
415
411
PRIORITY
416

FIGURE 4A

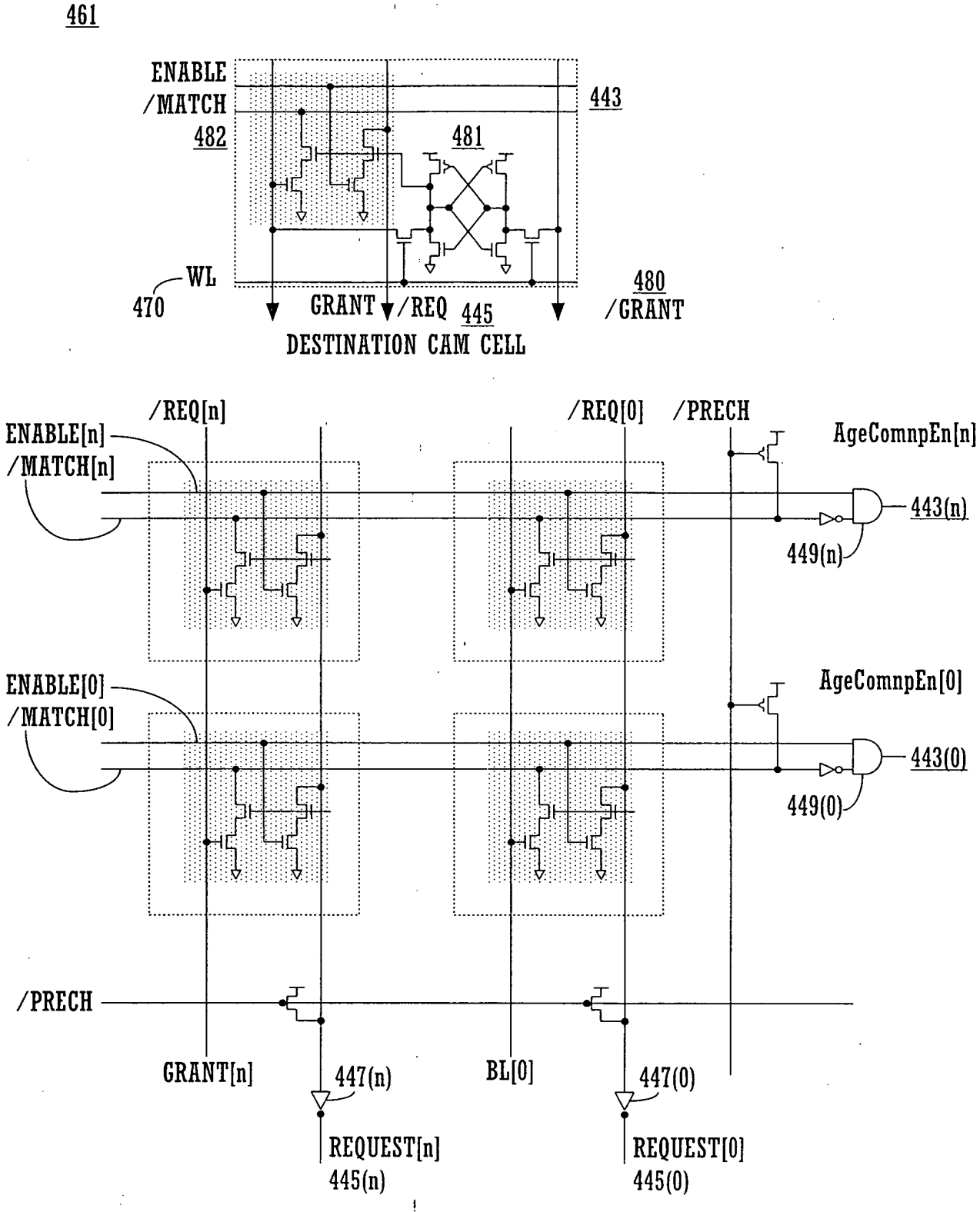
461
ENABLE
/MATCH
482
481
443
WL
470
GRANT
/REQ
445
480
/GRANT
DESTINATION CAM CELL
/REQ[n]
/REQ[0]
/PRECH
ENABLE[n]
/MATCH[n]
AgeComnpEn[n]
443(n)
449(n)
ENABLE[0]
/MATCH[0]
AgeComnpEn[0]
443(0)
449(0)
/PRECH
GRANT[n]
447(n)
BL[0]
447(0)
REQUEST[n]
445(n)
REQUEST[0]
445(0)

FIGURE 4B

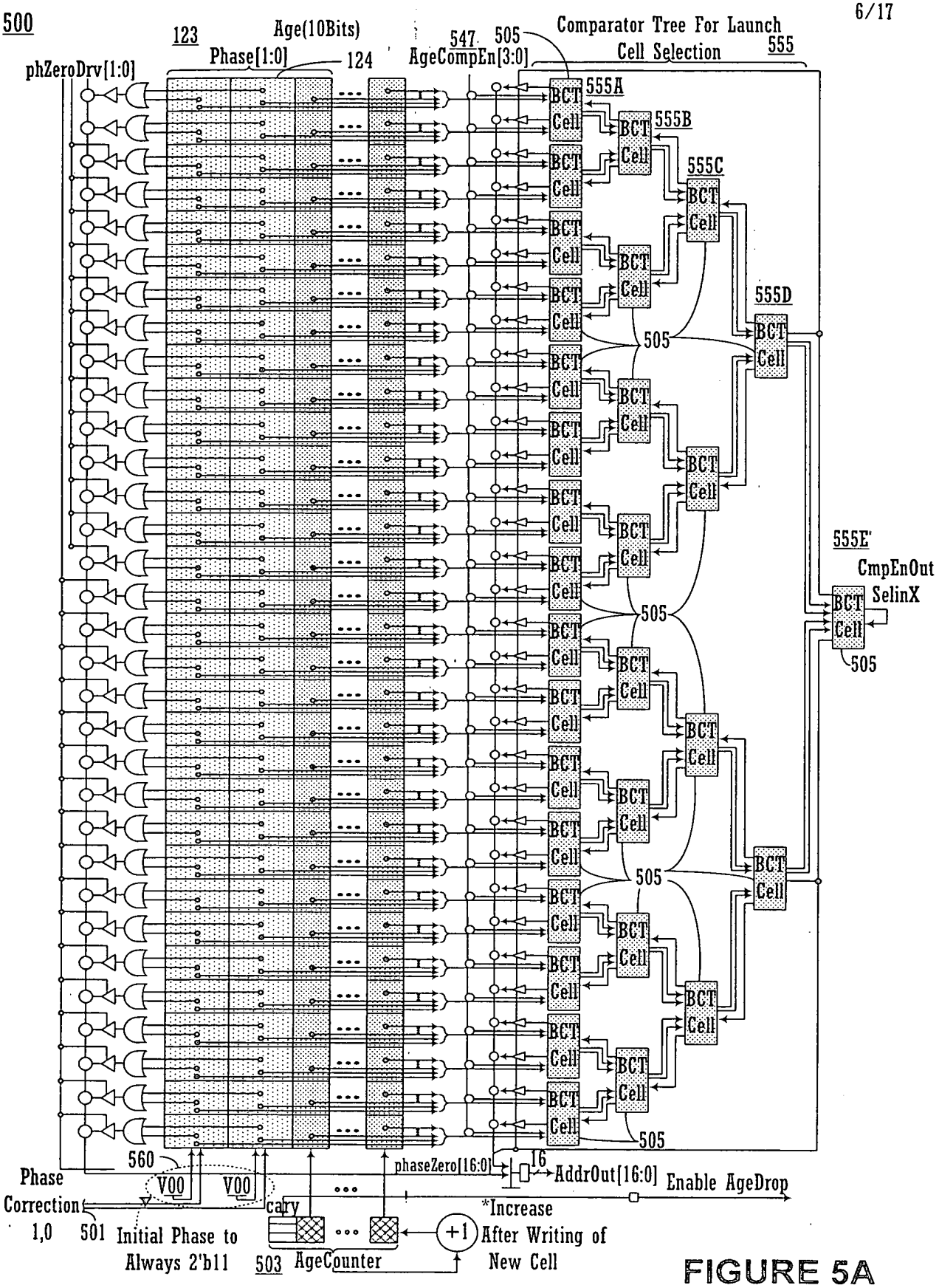
500
123
Age(10Bits)
Phase[1:0]
124
547
505
AgeCompEn[3:0]
Comparator Tree For Launch
Cell Selection
555
phZeroDrv[1:0]
555A
555B
555C
555D
555E
BCT
Cell
CmpEnOut
SelinX
505
560
Phase
Correction
1,0
501
V00
carry
Initial Phase to
Always 2'b11
503
AgeCounter
+1
*Increase
After Writing of
New Cell
phaseZero[16:0]
16
AddrOut[16:0]
Enable AgeDrop

FIGURE 5A

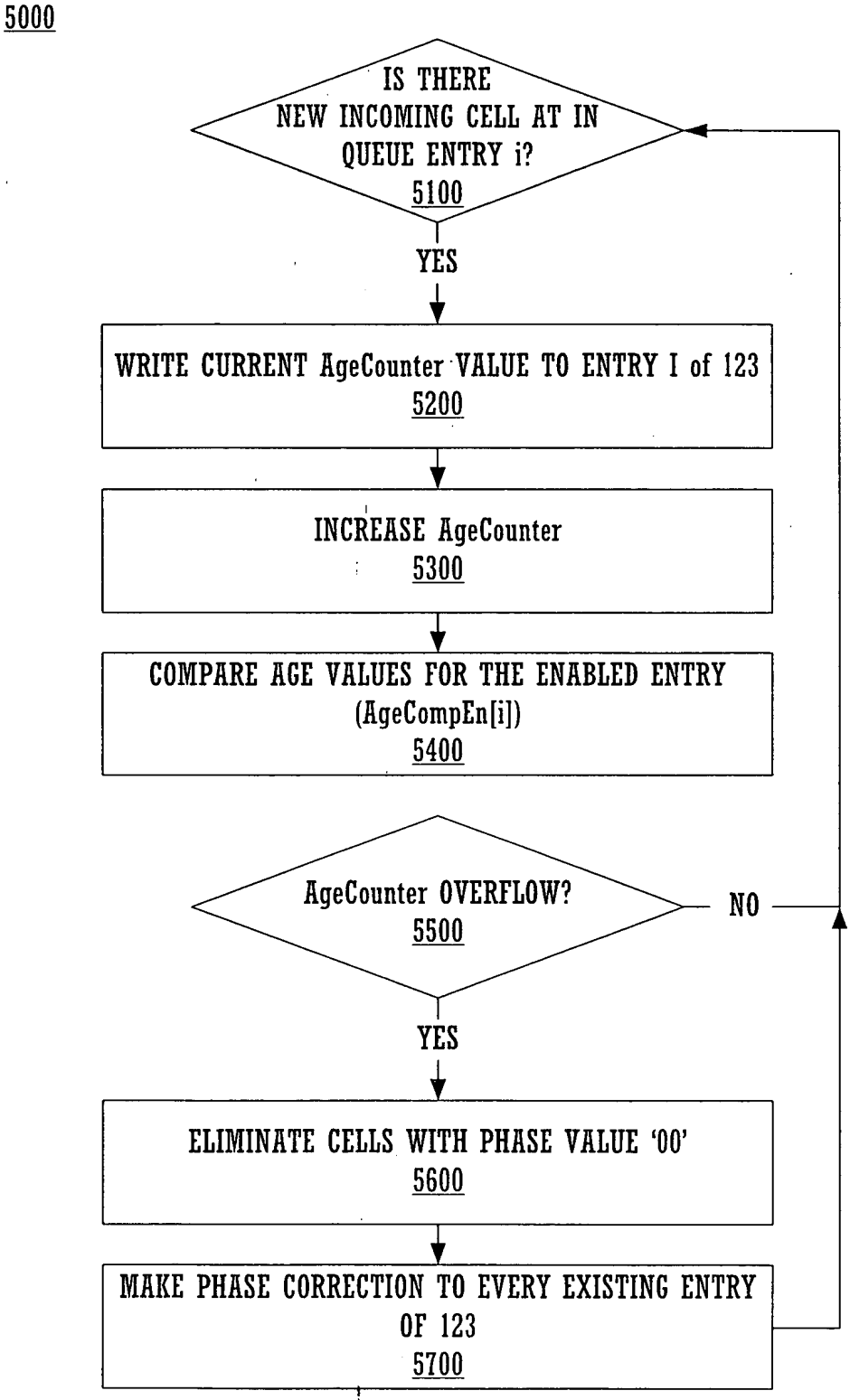
5000
IS THERE NEW INCOMING CELL AT IN QUEUE ENTRY i?
5100
YES
WRITE CURRENT AgeCounter VALUE TO ENTRY I of 123
5200
INCREASE AgeCounter
5300
COMPARE AGE VALUES FOR THE ENABLED ENTRY (AgeCompEn[i])
5400
AgeCounter OVERFLOW?
5500
NO
YES
ELIMINATE CELLS WITH PHASE VALUE '00'
5600
MAKE PHASE CORRECTION TO EVERY EXISTING ENTRY OF 123
5700

FIGURE 5B

PHASE CELL STRUCTURE FOR THREE STEP SELF ADJUSTMENT
(11 → 10 → 00 → INVALIDATE)

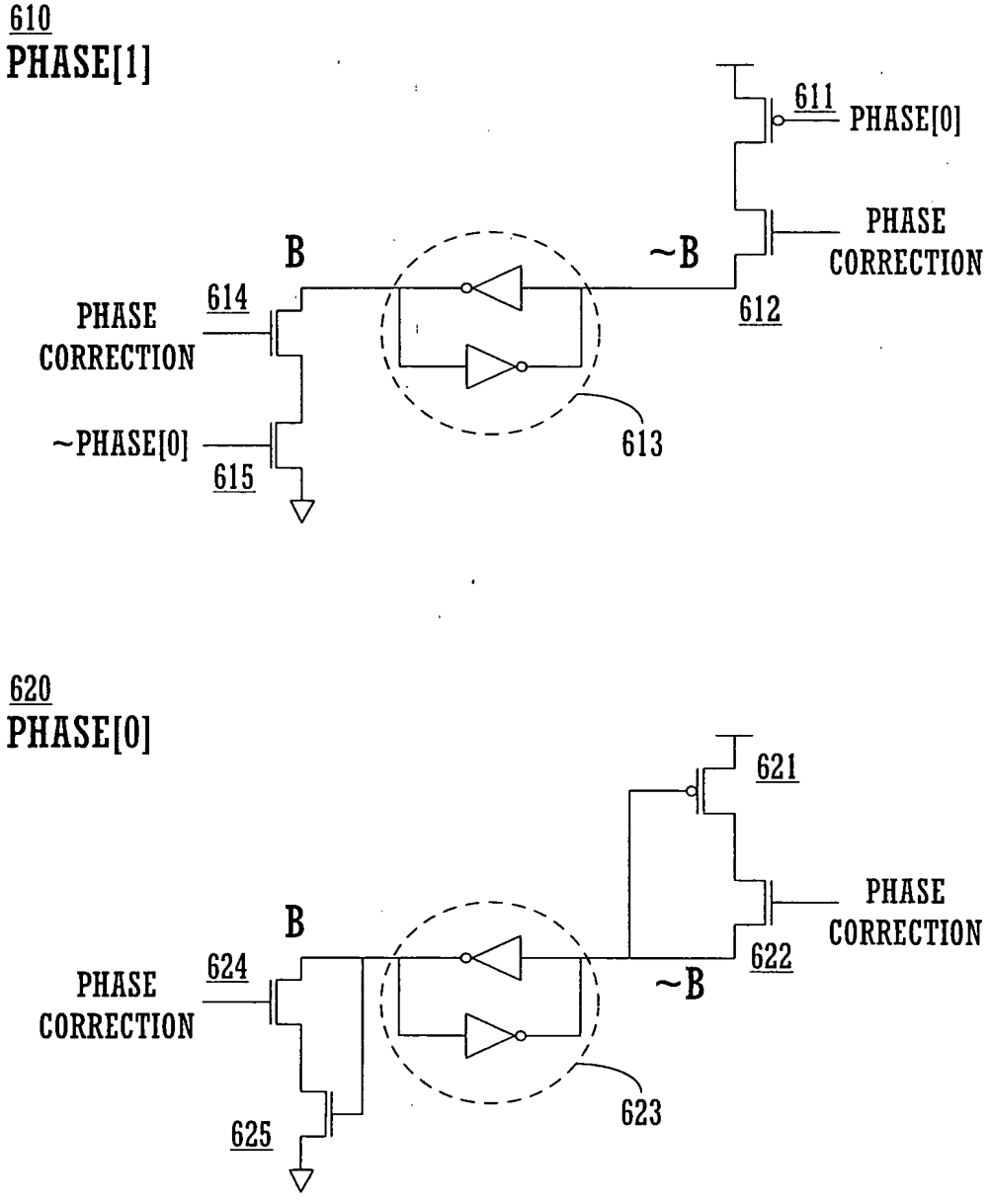

FIGURE 6

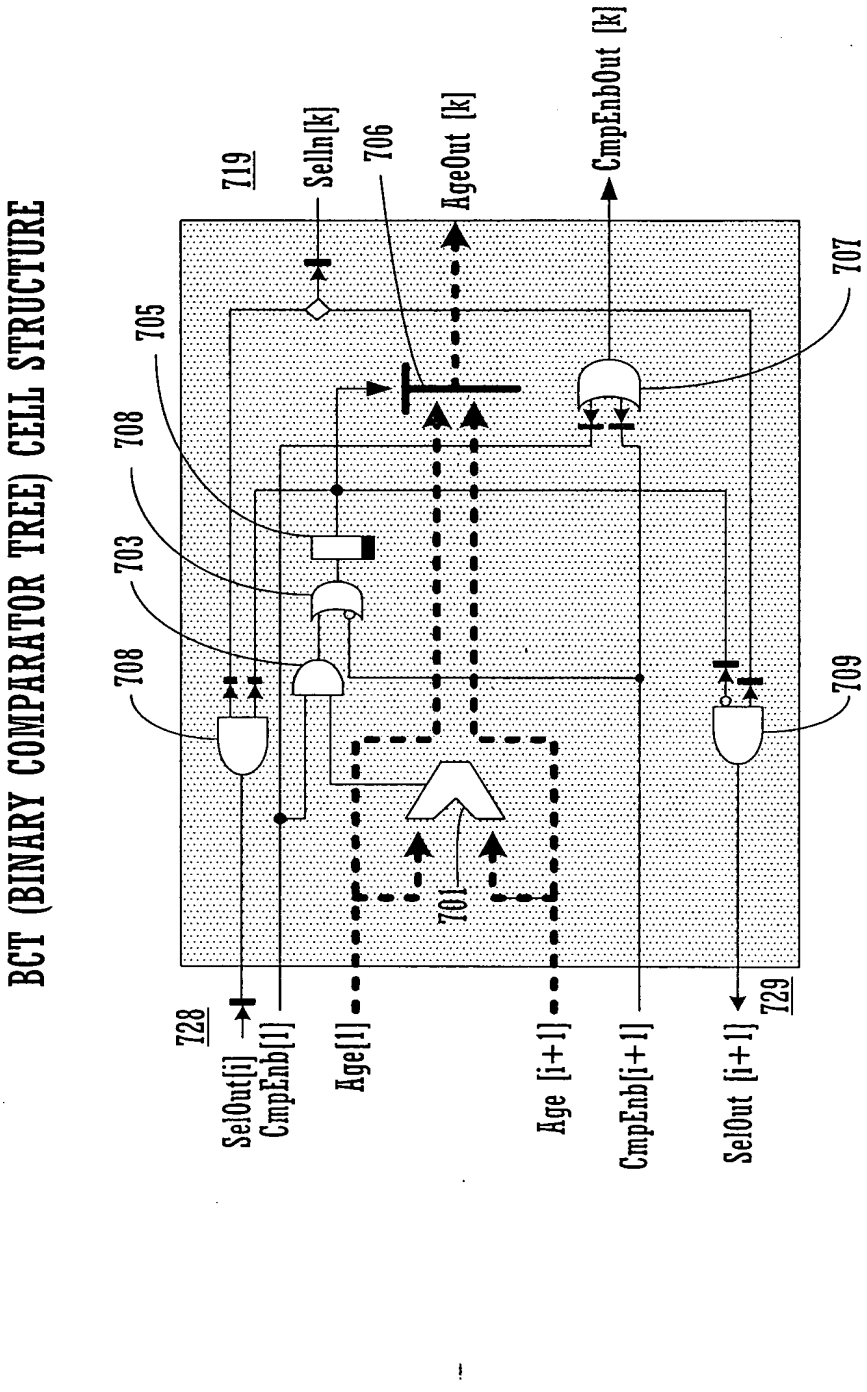
BCT (BINARY COMPARATOR TREE) CELL STRUCTURE
505
719
SelIn[k]
706
AgeOut [k]
CmpEnbOut [k]
707
705
708
703
708
709
701
728
SelOut[i]
CmpEnb[i]
Age[i]
Age [i+1]
CmpEnb[i+1]
SelOut [i+1]
729

FIGURE 7

1100

INTERLEAVED AGE-PRIORITY BASED SELECTION

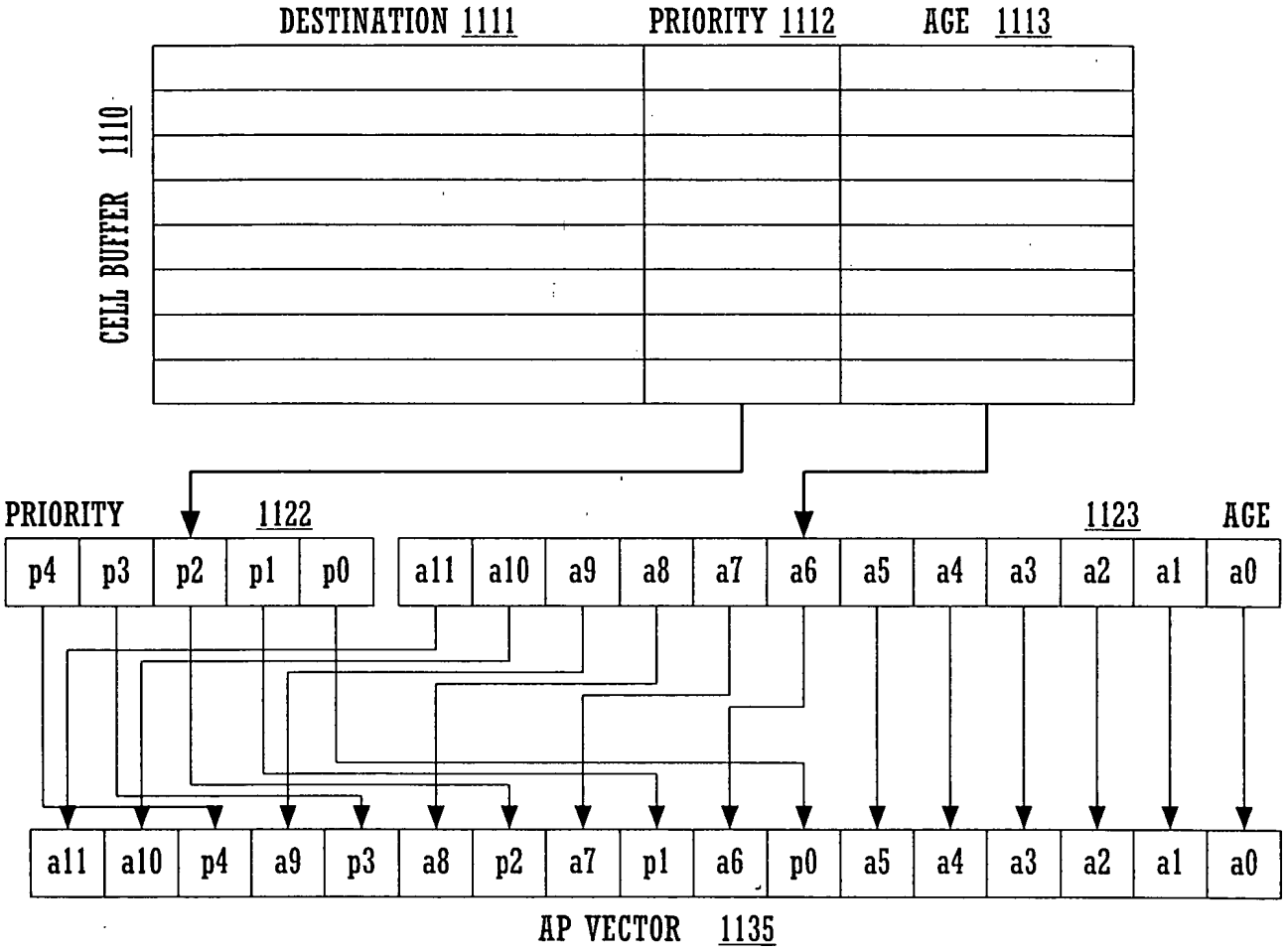

FIGURE 8

1200

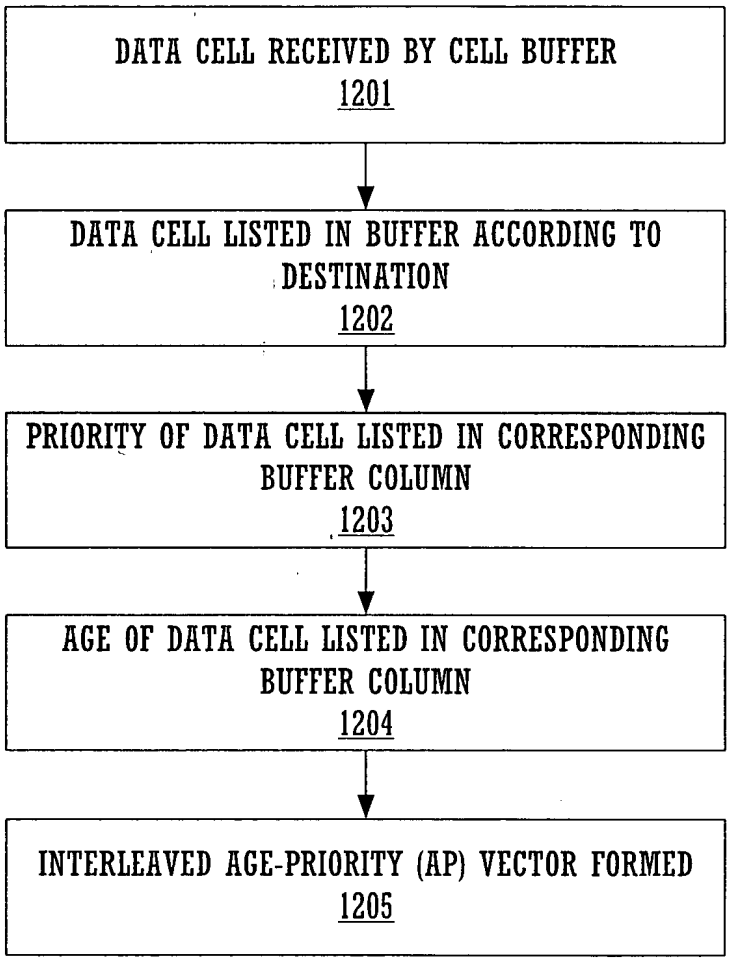

FIGURE 9

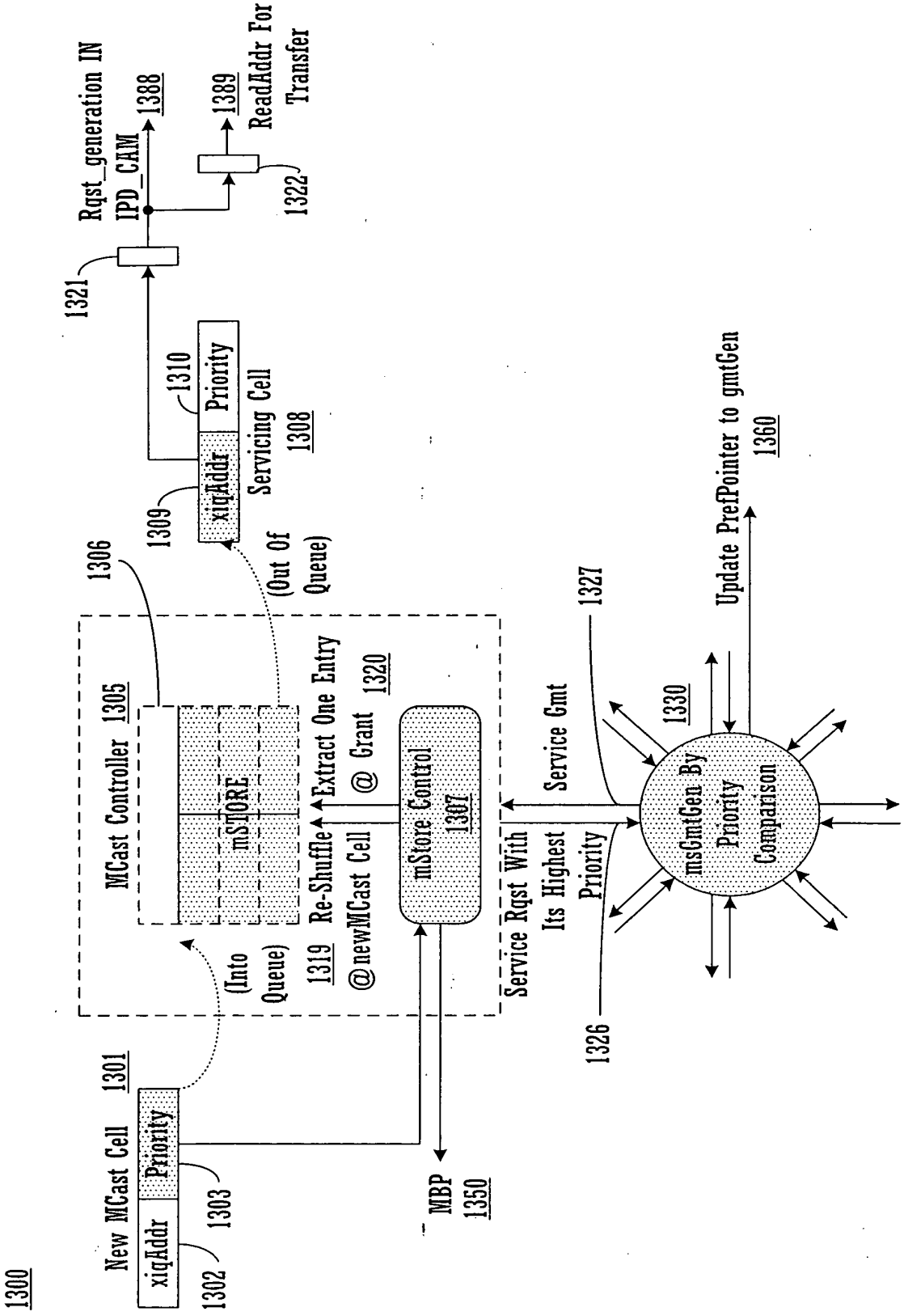
1300
New MCast Cell 1301
xiqAddr
Priority
1302
1303
MBP 1350
MCast Controller 1305
1306
mSTORE
(Into Queue)
1319 Re-Shuffle @ newMCast Cell
Extract One Entry @ Grant 1320
mStore Control 1307
Service Rqst With Its Highest Priority
Service Gmt 1327
1326
1330
msGmtGen By Priority Comparison
Update PrefPointer to gmtGen 1360
1309
xiqAddr
1310
Priority
Servicing Cell 1308
(Out Of Queue)
1321
Rqst_generation IN IPD_CAM 1388
1322
1389
ReadAddr For Transfer

FIGURE 10

1400

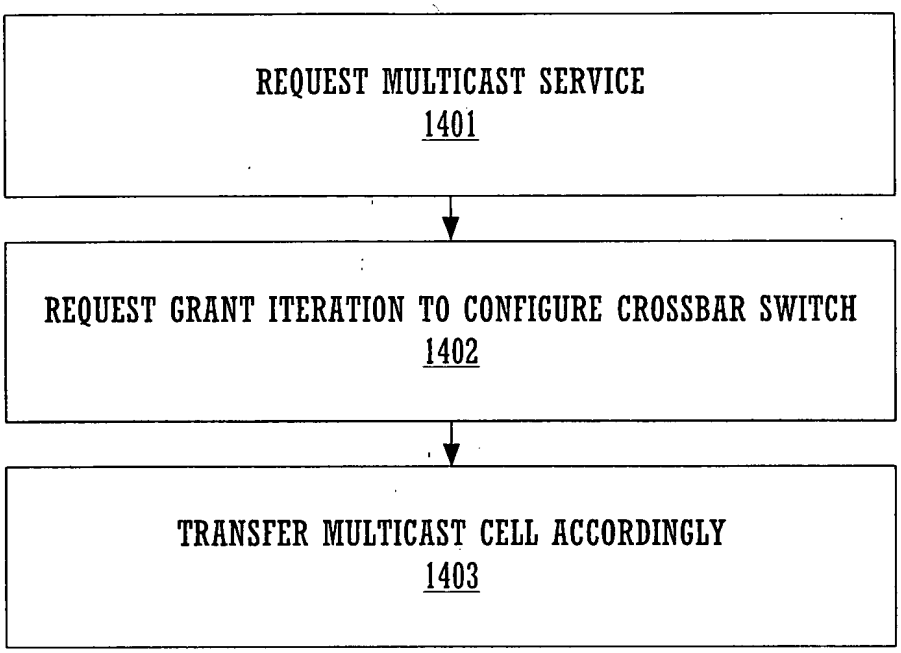

FIGURE 11A

1450

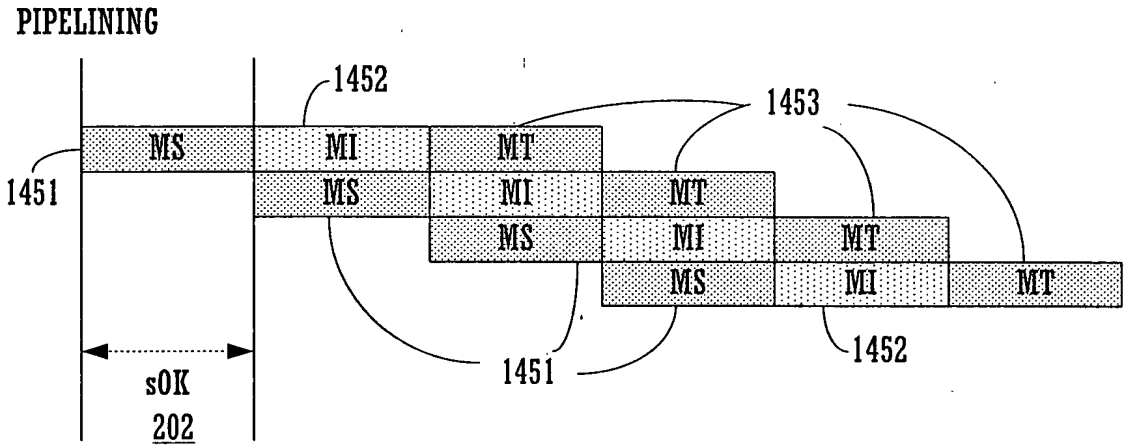

FIGURE 11B

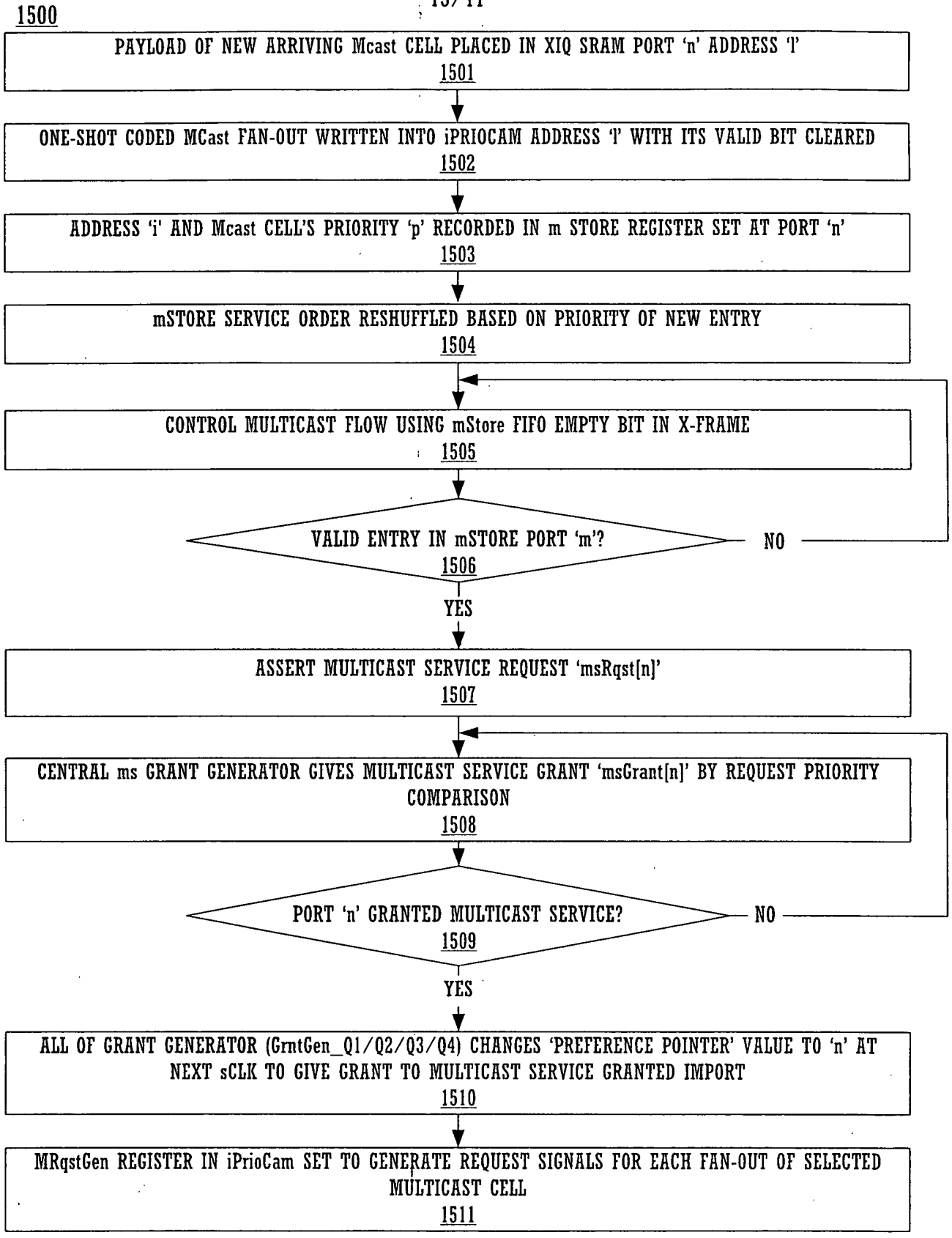
1500
PAYLOAD OF NEW ARRIVING Mcast CELL PLACED IN XIQ SRAM PORT 'n' ADDRESS 'I'
1501
ONE-SHOT CODED MCast FAN-OUT WRITTEN INTO iPRIOCAM ADDRESS 'I' WITH ITS VALID BIT CLEARED
1502
ADDRESS 'i' AND Mcast CELL'S PRIORITY 'p' RECORDED IN m STORE REGISTER SET AT PORT 'n'
1503
mSTORE SERVICE ORDER RESHUFFLED BASED ON PRIORITY OF NEW ENTRY
1504
CONTROL MULTICAST FLOW USING mStore FIFO EMPTY BIT IN X-FRAME
1505
VALID ENTRY IN mSTORE PORT 'm'?
1506
NO
YES
ASSERT MULTICAST SERVICE REQUEST 'msRqst[n]'
1507
CENTRAL ms GRANT GENERATOR GIVES MULTICAST SERVICE GRANT 'msGrant[n]' BY REQUEST PRIORITY COMPARISON
1508
PORT 'n' GRANTED MULTICAST SERVICE?
1509
NO
YES
ALL OF GRANT GENERATOR (GrntGen_Q1/Q2/Q3/Q4) CHANGES 'PREFERENCE POINTER' VALUE TO 'n' AT NEXT sCLK TO GIVE GRANT TO MULTICAST SERVICE GRANTED IMPORT
1510
MRqstGen REGISTER IN iPrioCam SET TO GENERATE REQUEST SIGNALS FOR EACH FAN-OUT OF SELECTED MULTICAST CELL
1511

FIGURE 12

1700

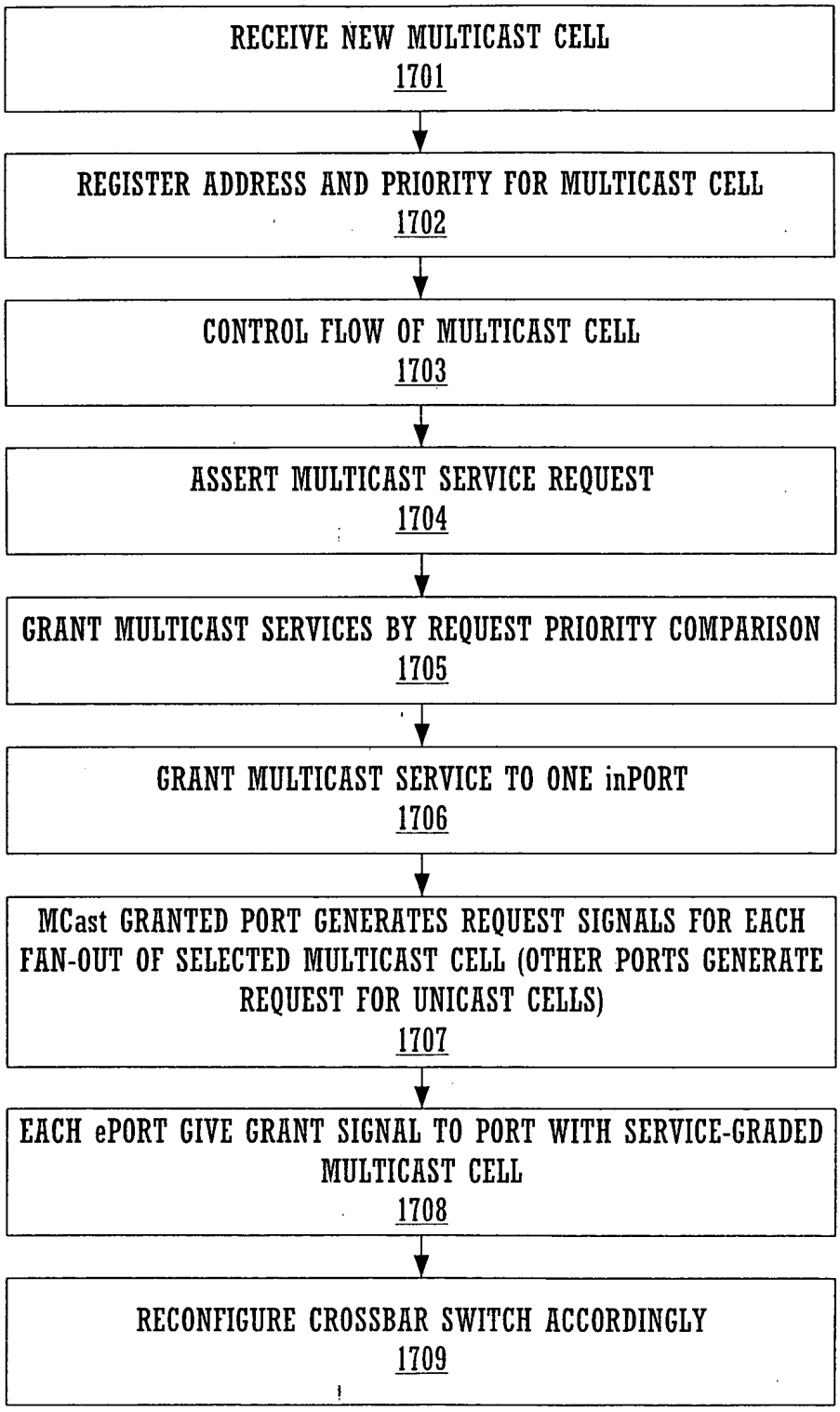

FIGURE 13

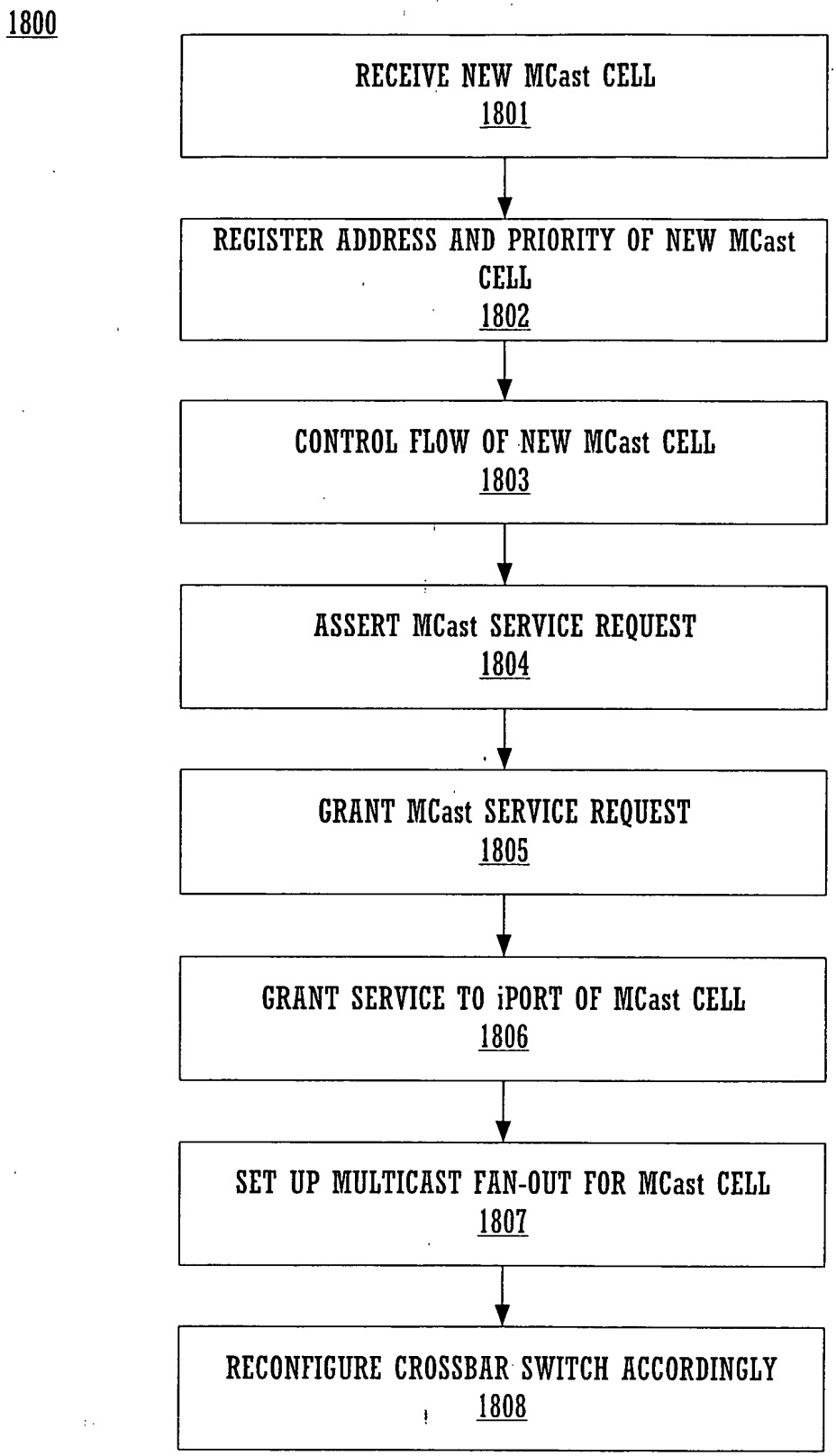
1800
RECEIVE NEW MCast CELL
1801
REGISTER ADDRESS AND PRIORITY OF NEW MCast CELL
1802
CONTROL FLOW OF NEW MCast CELL
1803
ASSERT MCast SERVICE REQUEST
1804
GRANT MCast SERVICE REQUEST
1805
GRANT SERVICE TO iPORT OF MCast CELL
1806
SET UP MULTICAST FAN-OUT FOR MCast CELL
1807
RECONFIGURE CROSSBAR SWITCH ACCORDINGLY
1808

FIGURE 14